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NEW GREGARINES FROM COLEOPTERA

MINNIE WATSON KAMM

The following pages contain descriptions of two species of gregarines which are believed to be new to literature.

GREGARINA PLATYDEMA nov. spec. (Figs. 1 to 4)

Host: *Platydema excavatum* Say (Tenebrionidae) Det. Chas. A. Hart
Location: Urbana, Illinois, June, 1917
Habitat: Intestine

The sporonts of this species are regularly biassociative, altho anomalies occur more frequently than in any other species observed by the writer. The specimens found occurred in the intestine of a tiny black tenebrionid beetle, about twelve associations and half as many cephalonts being found in each of two hosts. The maximum length of an association found was 2.41 mm.

The individual sporont is cylindrical and slender (Fig. 1), being on an average eight times as long as wide in the primite, the first member of the association, and four times as long as wide in the second member, the satellite. The protomerite of the primite is globular in shape, flattened slightly at its attachment to the deutomerite; its width and height are very nearly identical. The average ratio of LP: TL (see table at end) is about 1 : 12. The deutomerite is slightly constricted at its junction with the protomerite, but soon attains its maximum width which is maintained throughout the entire length, the posterior end being abruptly truncated.

The satellite differs considerably in form from the primite. The protomerite is much flattened, being only one-third to one-half as long as it is wide; it is more flattened in the large than in the small sporonts and is cupped deeply to insure a firm connection between the two members of the association. The deutomerite here is also cylindrical, bluntly rounded posteriorly. The average ratio of LP: TL is about 1 : 15. The width of the protomerite in the satellite bears about the same relation to the width of the deutomerite that it does in the primite: viz., 1 : 1.5.

Each sporont of the association is nearly transparent, no large scattered dark gray granules characterizing this species as is often true of practically transparent species.

The nucleus is conspicuous *in vivo* in both primite and satellite; it is a large sphere situated generally slightly below the center of the deutomerite and in the primite often attains a diameter of very little less than that of the sporont itself. In the satellite it is generally smaller in proportion to the diameter of the deutomerite than in the primite. One large karyosome is visible within.

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Cephalonts (Fig. 3) were numerous in my material. They are stout-bodied, relatively short and broad, and the ratio of LP: TL (without the epimerite) is about 1: 5, while that of WP: WD is about 1: 1. The epimerite consists of a simple cone of about the same length as width surmounting the typically-shaped protomerite. This cone-shaped epimerite is unusual for the genus gregarina in which I place it, but similar epimerites have heretofore been reported; viz. in *Gregarina statirae* Frenzel in which it is a short cylindrical papilla rounded at the apex, and in *Gregarina acuta* (Léger) in which it is reported as a sharp point (Watson, 1916: 177).

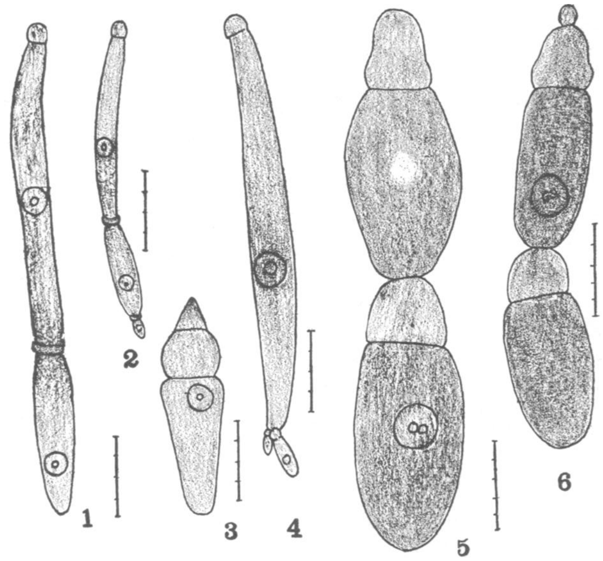

Fig. 1.—Typical association of sporonts of *Gregarina platydema.*

Fig. 2.—Atypical association, *Gregarina platydema,* consisting of a chain of three sporonts, the third minute.

Fig. 3.—Cephalont of *Grcgarina platydema.*

Fig. 4.—Three atypically conjoined sporonts of *Gregarina platydema,* the satellites minute.

Fig. 5.—*Gregarina diabrotica,* characteristic association.

Fig. 6.—*Gregarina diabrotica,* abnormal group, the primite of which has not yet lost its epimerite.

In Figures 1, 2, 3 and 4 the reference line is 0.2 mm. long, and in Figures 5 and 6 it is 0.05 mm. long.

The chief peculiarity which occurs among the sporonts of this species is the great difference in the lengths of the associative sporonts, some being four times longer than others, all, however, perfectly joined. This variation is not sudden for fairly even gradations occur, and for this reason the presence of a dimorphism cannot be entertained; the sporonts merely become associative long before they are ready for reproduction. All the free cephalonts seen were as large as many of the associative primites and when they would have attained the proportions of mature sporonts would be among the largest measured; it is, of course, true that smaller cephalonts are found embedded in the intestinal epithelium.

In one instance (Fig. 2), an association consisted of three individuals in a chain, the third being minute — one-fourth the length of the first satellite and one-eighth the length of the primite. Another irregularity (Fig. 4) consisted of a triple association, the two satellites being attached to the posterior end of the primite; both were diminutive, only about one-eighth the length of the primite.

In many species studied by the writer where hundreds of specimens were observed no abnormalities or very exceptional ones have been seen to occur. It is possible that such species as the present one are relatively new parasites to their present hosts and have not yet adjusted themselves to the conditions of parasitism offered by the hosts in question.

This species is placed in the family Gregarinidae since that family alone is characterized in part by associations of individuals with septa; and in the genus Gregarina because of the biassociation character and the shape of the epimerite. The species somewhat resembles in form *Gregarina socialis* Léger, a figure but no description or dimensions of which is given in the original reference (Léger, 1906). The latter species, however, is differentiated a), by possessing a small chromidial body in the protomerite, and b), by existing in associations of as many as ten individuals.

Dimensions in microns of several typical live specimens are given below.

	Primite				Satellite			
	a	b	c	d	a	b	c	d
Length protomerite ...	50	50	90	70	20	30	20	40
Length deutomerite...	570	800	920	1130	240	410	520	1180
Width protomerite....	60	60	90	75	50	60	70	80
Width deutomerite....	90	100	140	170	75	100	120	150
Diameter nucleus.....	35	80	70	120	35	70	60	70
Diameter nucleolus....	...	11	...	40	...	20	...	20
Total length sporont..	620	850	1010	1200	260	440	540	1210
Ratio LP : TL......	1:12.4	1:17	1:11.2	1:17	1:13	1:15	1:27	1:30
Ratio WP : WD......	1:1.5	1:1.6	1:1.5	1:2	1:1.5	1:1.6	1:1.7	1:1.9
Total length association	880	1290	1550	2410				

Numerous biassociative and young solitary sporonts of this species have been taken from each of a half dozen beetles of the species listed which is a pest to both wild and cultivated cucumber vines.

The sporonts are elongate-cylindrical, flattened at each end and about three times as long as the maximum width. The largest sporont seen measured 270μ by 105μ. The largest association was 530μ long. The ratio LP: TL of the primite was about 1: 3.5; that of WP: WD 1: 1.6.

The protomerite of the primite is broadly dome-shaped and constricted somewhat in the mid region. It is slightly longer than wide, the widest portion being in the posterior third. It again becomes constricted at the septum; the whole shape, therefore, is unique and a constant and characteristic feature of the species. The outline of the deutomerite is typical of that of many gregarines, widening immediately below the septum and retaining the same width throughout the entire length, except at the broadly rounded posterior extremity. The protomerite of the satellite is lower and lacks the constriction of that of the primite; it is regularly dome-shaped with the apex slightly flattened at its contact with the primite. The deutomerite is essentially like that of the primite.

The protoplasm is dark gray, almost black in transmitted light in the deutomerite and slightly less dense in the protomerite. The nucleus is spherical, of good size, and contains two or three minute karyosomes.

The epimerite is small, sessile and spherical, characteristic of the genus Gregarina, in which it is placed because of the epimerite and the biassociative sporonts. A table of a few typical measurements in microns of live sporonts follows:

	Primite				Satellite		
	a	b	c	d	a	b	c
Length protomerite	60	70	50	60	50	50	40
Length deutomerite	200	190	100	165	210	200	180
Width protomerite	60	50	40	50	70	80	50
Width deutomerite	90	90	60	70	100	105	65
Total length sporont	260	260	150	225	270	250	220
Ratio LP : TL	1 :4.3	1 :3.7	1 :3	1 :3.6	1 :5.4	1 :5	1 :5.5
Ratio WP : WD	1 :1.5	1 :1.8	1 :1.5	1 :1.4	1 :1.4	1 :1.3	1 :1.3
Total length association	530	510	370				
Diameter nucleus	...	...	...	30			

GREGARINA DIABROTICA nov. spec. (Figs. 5 and 6)

Host: *Diabrotica vittata* Fabr. (Chrysomelidae)
Location: Urbana, Illinois, June, 1917
Habitat: Intestine

This beetle is also one of the hosts of a nematode, the larvae being found in the body cavity of two specimens in countless hundreds massed tightly against the internal organs. That the larvae exert a baneful influence upon the host is shown by the fact that after half a dozen of the host beetles had been kept in captivity for twelve hours none showed ill effects except two which were sluggish, apparently at the point of death when opened, and which proved to be heavily parasitized. The hosts must, therefore, eat regularly and often in order to feed so great a number of intruders.

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